REMARKS

In the Claims

Claims 13-28 are pending in the application and have been rejected. In the present response, claims 13, 14, 16, 19, and 21-28 has been amended. Reconsideration and reexamination of the pending claims are respectfully requested in view of the present amendments and remarks.

A. The Objections to the Claims

Claims 16 and 27 have been objected to under 37 CFR 1.75(c). It is believed that the present amendments to claims 16 and 27 overcome this ground for rejection.

B. The Rejections under 35 U.S.C. 101

Claims 13-28 have been rejected under 35 USC 101, although such claims recite that the neural network is implemented in a computer or a program storage device readable by a machine. It is presumed that this rejection is based on *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008), which is presently under advisement at the U.S. Supreme Court.

This ground for rejection is respectfully traversed at least for the following reasons.

In his brief to the U.S. Supreme Court through the General Counsel, Solicitor General and other attorneys of the USPTO, Mr. David Kappos, Under Secretary of Commerce for Intellectual Property and Director, United States Patent and Trademark Office, stated at pages 38-39:

> As the Board noted below, the machine-or-transformation definition may readily encompass most software claims because such claims could be said to concern the use of a machine (*i.e.*, the computer itself) or involve a transformation of matter (*i.e.*, the writing and re-writing of data, represented by magnetic changes in the substrate of a hard disk or the altered energy state of transistors in a memory chip). Pet. App. 177a-178a. This conception of the machine-or-transformation test is reflected in non-binding interim examination instructions issued by the PTO in August 2009. See United States PTO, *Interim Examination Instructions for Evaluating Subject Matter Eligibility Under 35 U.S.C. § 101* (Aug. 24, 2009) (*Interim Instructions*). The *Interim Instructions* state that "computer implemented processes" are often disclosed as connected to a machine, *i.e.*,

> a general purpose computer. *Id.* at 6. Such a computer, "when programmed to perform the process steps" so that it performs the specific function contemplated by the process, "may be sufficiently 'particular'" for purposes of the machine-or-transformation test. *Ibid.*; cf. *In re Alappat*, 33 F.3d 1526, 1545 (Fed. Cir. 1994) (en banc) ("[A] general purpose computer in effect becomes a special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software.") (Footnotes omitted).

The above statements indicate that a claim having the recitations of Applicant's claims 13-28 is patentable under 35 USC 101, as interpreted by the USPTO in front of the U.S. Supreme Court. More particularly, Applicant's claims concern "the use of a machine (i.e., the computer itself) or involve a transformation of matter (*i.e.*, the writing and re-writing of data, represented by magnetic changes in the substrate of a hard disk or the altered energy state of transistors in a memory chip)" and, as such, are not to be rejected by the Office based on the representations made by Mr. Kappos to the US Supreme Court.

In the Response to Arguments section, the Office Action has remarked that Applicant's invention may be performed on a variety of machines and has cited machines such as the MINOS I and II. It is respectfully submitted that the above statements by Mr. Kappos do not tie software patentability to any specific type of machine. Consistently with such representations, a large numbers of software patents have been issued by the Office that are applicable to a variety of computer models.

Finally, the Office Action has defines the MINOS I and II machines as analog learning machines. Applicant first restates that the analog v. digital difference is not believed relevant for patentability under 35 USC 101. Moreover, the SRI paper cited as evidence in the Office Action defines the MINOS machines as having a pattern of binary inputs, arranged in 8 x 8 array. It is respectfully submitted that such description is indicative of a digital machine rather than of an analog machine.

Based on the foregoing, the withdrawal of the pending rejections under 35 USC 101 is respectfully requested.

C. The Rejections under 35 U.S.C. 102(b) and 103(a)

Claims 13-18 have been rejected under 35 USC 102(b) over *Fahlman et al.*, The Cascade-Correlation Learning Architecture, Carnegie Mellon University (1991). The related

claim analysis in the Office Action discusses claims 13-17 and 28. Accordingly, it is unclear to Applicant whether claims 19-28 or instead claims 17-27 are to be considered allowable after the rejection under 35 USC 101 is overcome.

In either case, the rejection of claims 13-18 or, alternatively, of claims 13-17 and 28 is respectfully traversed at least for the following reasons.

Fahlman teaches a Cascade-Correlation, which combines two principles: (1) cascade architecture, in which hidden units are added to the network one at a time and do not change after they have been added, and (2) learning algorithm, which creates and installs the new hidden units. See, e.g., Fahlman at page 3. Fahlman further teaches that the output units may just produce a linear sum of their weighted inputs, or may employ a symmetric sigmoidal activation function (hyperbolic tangent).

Beyond the teachings of Fahlman related to additions and "freezing" of nodes, Fahlman appears to fall within the prior art disclosed by Applicant, in which a node weighs the inputs to the input nodes, and then transforms them through a non-linear function. See, e.g., FIG. 1 of Applicant, in which Σ indicates a summation unit and F indicates a non-linear transformation unit.

Differently from that, claims 13 and 28 recite that, upstream of a summation step or unit (indicated by Σ in the embodiment depicted in FIG. 3) and also of a non-linear transformation unit or step (indicated by F in the embodiment depicted in FIG. 3), a functional receiving function or unit (indicated by R in the embodiment depicted in FIG. 3) performs a non-linear transformation of input data. Accordingly, claims 13 and 28 recite (the recitation of claim 1 will be reproduced hereinafter):

> "a first transformation step comprising at least one sub-step summing the input data received from the input nodes to the said output nodes by weighing the said input data, and
>
> a second transformation step which nonlinearly transforms the results of the first transformation step,
>
> wherein in each output node said first transformation step comprises two substeps:

a first sub-step being a nonlinear transformation function of the input data received by the output nodes from the input nodes, and

the second sub-step being said summing step of said input data which has been nonlinearly transformed in said first sub-step."

Therefore, Fahlman teaches a function similar to Applicant's second sub-step or alternatively to Applicant's second transformation step. Fahlman does not teach or suggest, among other things, the contemporaneous use of the first sub-step, which, in one embodiment, introduces a dependency of each i-th transformed value by the spatial position of the coordinate value with respect to a spatial wave of a given wavelength, followed by the second sub-step and then by the second transformation step. See, e.g., paragraph [0072] of the published application and onward.

The Office Action has cited page 3 of Fahlman as allegedly anticipating claim 13. Applicant respectfully submits that this is not correct.

In primis, Fahlman teaches using either a linear sum of the weighted inputs, or some non-linear activation function, but not the use of both for the same node (please note that Fahlman uses the alternative conjunction "or" instead of an additive conjunction in describing the linear sum and the non-linear activation function).

Moreover, Fahlman does not teach or suggest implementing a fist substep performing a non-linear transformation followed by second substep performing a summing up, and then followed by a second transformation step performing a non-linear transformation. The improvement provided by Applicant's claimed network and program storage device over the prior art are described in detail in the specification.

Therefore, independent claims 13 and 28 are not anticipated by Fahlman because Fahlman does not teach all the elements of Applicant's claimed invention. Dependent claims 14-27 are not anticipated by Fahlman for the same reasons as claim 13 and for the additional limitations contained therein.

Conclusion

It is believed that all objections and rejections in the application have been addressed and that the application is now in condition for allowance. A notice to that effect is respectfully requested.

The required fee for a three-month extension of time is enclosed herewith.

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Respectfully submitted,

/Franco A. Serafini/

Franco A. Serafini, Registration No. 52,207
Attorney for Applicant
Tel. (858) 456-2898
Fax (858) 225-3920

THEMIS LAW
7660 Fay Ave Ste H-535
La Jolla, CA 92037